Organic Farming for Sustainable Agriculture in Paschim Medinipur, West Bengal: Determinants of Its Prospects and Constraints

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Submitted by

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Declaration

I do hereby declare that the present Master thesis entitled '***Organic Farming for Sustainable Agriculture in Paschim Midnapur, West Bengal: Determinants of Its Prospects and Constraints*** 'embodies the original research work carried out by me in the Department of Geography, Midnapore City College, Paschim Medinipur, West Bengal, India under the supervision of Dr. Amartya Pani, Assistant Professor in Geography, Pure and Applied Sciences, Midnapore City College. No part thereof has been submitted for any degree or diploma in any University.

Date:

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Approval Sheet

This project report entitled "**Organic Farming for Sustainable Agriculture in Paschim Midnapur, West Bengal: Determinants of Its Prospects and Constraints"** by …….is approved for the degree of Master of Science/Master of Arts in Geography.

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Dedicated to my Parents

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Abstract

Historically, agricultural development relied on short-term production based on external inputs, neglecting and misusing natural resources. Consequently, it harms ecosystems and food security. Farmers, scientists, and policymakers must now consider sustainable organic farming methods. Sustainable organic farming is more likely in India. Research and development are needed to comprehend complicated ecological processes and farmer management in this regard. So, this study examined organic farmers' acceptance of sustainable agricultural techniques and Green Revolution Agriculture (GRA) farmers' reasons for not adopting them. This will help us develop ways to promote sustainable organic farming among farmers to solve the food issue. The current study discusses the concept, aims, and scope of organic farming in the context of the Indian subcontinent in general West Bengal in particular. Government strategies to promote organic farming will also be discussed. Moreover, this paper envisages the economic viability of organic farming i.e. Zero Budget Natural Farming (ZBNF) in Paschim Medinipur district of West Bengal. Performance of the comparative in depth models will be evaluated by considering three important parameters i.e. cost of cultivation, yield and income. Both secondary and primary data will be used for addressing the research objectives and appropriate statistical tools and econometric techniques will be applied for data analysis. The necessity of developing an organic route that is both ecologically and economically viable in order to enable more adaptation among farmers has also been emphasised.

Key words: Organic farming; Sustainable agriculture; Determinants; Prospects; Constraints; Zero Budget Natural Farming; ecological; West Bengal.

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1. Introduction

India has relied on agriculture for ages. Agriculture and allied services support about half of the country's population (Tripathi et al., 2018). Indian agriculture has changed dramatically in recent decades. Indian agriculture went from subsistence to commercial with "Green Revolution" methods. Notwithstanding its success, the input-intensive "Green Revolution" of recent decades has sometimes concealed severe externalities, hurting natural resources, human health, and agriculture. With mounting worries about the sustainability of the current input-intensive agriculture system, an alternative farming system is needed (Mader et al., 2002). Organic agriculture, a low-input farming method, promises farmers lower input costs and higher yield. Organic indicates "plant or animal origin". It also refers to organism organisation. So, "organic agriculture" is vague in conceptually. Understanding organic farming principles allows a straightforward definition. Organic farming is actually a system. Farming without chemical inputs that conserves and protects soil and subterranean water biological potential from natural and human degradation. Agro-forestry and organic replenishment cropping models use it. Pest and disease management using natural and biological methods promotes soil life and beneficial interaction.

The system self-regulates and produces profitable and sustainable agricultural products. Organic Agriculture encompasses all agricultural methods that encourage the environmental, social, and economic sustainability of the production of food and fibre. This strategy emphasises the importance of local soil fertility for effective output. It attempts to optimise quality in all elements of agriculture and the environment by respecting the natural plants, animals, and scenery. By eschewing the use of chemical/synthetic fertilisers, pesticides, and medications, organic agriculture significantly minimises external inputs. Instead, it permits nature's mighty rules to boost agricultural production and disease resistance. Organic agriculture is also a rule-based agricultural system in which the farmer must adhere to the organic farming criteria established by the certifying body.

Organic agriculture is one of several approaches to sustainable agriculture, and many of the practises used (e.g., intercropping, crop rotation, mulching, and crop-livestock integration) are implemented under different agricultural systems. What distinguishes organic agriculture, as governed by various laws and certification programmes, is the prohibition of virtually all synthetic inputs and the requirement of "soil-building" crop rotations. The fundamental laws of organic agriculture stipulate that only natural inputs are permitted, whereas synthetic inputs

are prohibited. Yet, exceptions exist in both instances. Some natural inputs deemed hazardous to human health or the environment by various certification programmes are forbidden (e.g. Arsenic). In addition, certain synthetic inputs deemed important and compatible with the organic farming philosophy are permitted (e.g., insect pheromones). In addition to these two standards, numerous certification programmes include extra environmental protection procedures. Even if many farmers in the developing world do not utilise synthetic inputs, this is not enough to classify their operations as organic.

After using inorganic and mineral components for a long time, agricultural growth strategy is being rethought. Today, agricultural sustainability, soil deterioration (productivity and structure), biodiversity, human health, and environmental impact are significant factors. Throughout the 1990s, organic farming was promoted as an alternative to inorganic farming. Bio-fertilizers and bio-pesticides, organic farming, bio-dynamic farming, low-input agriculture, permaculture, sustainable agriculture, and integrated farming approaches (Integrated Pest Management and Integrated Nutrient Management) are all promoted in developed and developing countries (Pani and Mishra, 2019). With the global demand for green agriculture products, these methods are alternatives to inorganic farming. This growing demand for green agriculture products is both a limitation and an opportunity for agriculturists, producers, suppliers, and traders of agriculture inputs (fertilisers, insecticides, etc.) and outputs. Sustainable agriculture is universally desired, but how to achieve it is not. Sustainable organic farming is considered in many countries. This sustainability topic considers regulation, synthetic agrochemical use, agricultural systems' self-reliance, and agricultural production and commerce.

In this paper, an attempt has been made to bring together various issues related to organic farming in the light of recent developments at the global, national and state levels. This paper has examined the status, issues and prospects in Indian organic farming, highlighting its potential in the semi-arid dryland areas of West Bengal. This paper reviews the global status and the Indian scenario regarding organic farming. Also study discussed key issues related to organic farming such as yield reduction in conversion to organic farm, soil fertility, livestock, certification, ecology, marketing and policy support. Besides, the special benefits along with challenges of organic farming have been reviewed in the westernmost district of West Bengal. Finally, some concluding observations have been made.

1.1. The Current Situation and the Prospects for Organic Farming in India

India is in a class by itself among the 172 countries that engage in organic agriculture because it has 6, 50,000 organic farmers, 699 organic food processors, 669 organic food exporters, and 7,20,000 hectares of land under production. Yet, with only 0.7% of all agricultural land being used for organic farming, the business has a long way to go before it reaches its goal (Bordolo, 2016). Around 1.35 million metric tonnes (MT) of certified organic goods were produced in India in the 2015–2016 fiscal years. These goods include all different kinds of food products, such as sugarcane, oil seeds, cereals and millets, cotton, pulses, medicinal plants, tea, fruits, spices, vegetables, and coffee, among other things. The production is not restricted to the edible sector; in addition to edible products, it also produces organic cotton fibre and other useful food products.

1.2. World Scenario of Organic Farming

The most recent survey on certified organic agriculture conducted by the FiBL found that there were 50.9 million hectares of organic agricultural land in the world in 2015. Australia had the most organic agricultural land, with 22.7 million hectares, followed by Argentina, which had 3.1 million hectares, and the United States, which had 2 million hectares. The only region that has not seen a growth in organic agricultural land is South America. This trend can be seen in all other regions. In many African nations, such as Kenya, Madagascar, Zimbabwe, and Côte d'Ivoire, there was a significant proportional increase in the amount of land used for organic agricultural production (Willer and Lernoud, 2017).

1.3. The Current Situation for Organic Farming in West Bengal

The current situation for organic farming in West Bengal is promising. The state government has been providing support for organic farming through various schemes and initiatives, and the demand for organic food is growing both domestically and internationally.

Here are some of the key facts about the current situation for organic farming in West Bengal:

- As of 2022, West Bengal has 21,003 hectares of land under organic cultivation, which is about 0.48% of the state's total agricultural land.
- The West Bengal Organic Farming Promotion Board (WBOFPB) is the main government initiative for promoting organic farming in West Bengal. The WBOFPB

provides financial assistance to farmers who convert to organic farming, and it also supports the development of organic markets.

- The demand for organic food in West Bengal is growing rapidly. In 2021, the West Bengal organic food market was worth ₹1.5 billion, and it is expected to grow to ₹2.5 billion by 2025.

There are a number of challenges that need to be addressed in order to further the growth of organic farming in West Bengal. These include the lack of awareness among farmers about the benefits of organic farming, high cost of certification for organic products, lack of infrastructure for the marketing and distribution of organic products. Despite these challenges, the future of organic farming in West Bengal looks bright. With the right support from the government and the private sector, organic farming has the potential to become a major force in the West Bengal agricultural sector.

With the right support, organic farming can help to improve soil health, reduce water pollution, and increase biodiversity in West Bengal. It can also provide farmers with a more sustainable and profitable way of farming. There are some of the districts in West Bengal that are leading the way in organic farming: North 24 Parganas, Jalpaiguri, Malda, Darjeeling, Birbhum and Jhargram. These districts have all made significant investments in organic farming, and they are now home to some of the largest areas of organic land in the state. The growth of organic farming in West Bengal is a positive development for the state's agricultural sector. Organic farming can help to improve soil health, reduce water pollution, and increase biodiversity. Additionally, organic food is often healthier and more nutritious than conventional food. As the demand for organic food continues to grow, organic farming is likely to become even more important in West Bengal. The government and the private sector need to work together to address the challenges facing organic farming, and to ensure that the state continues to be a leader in this field.

2. Literature Review

Organic farming improves biodiversity, biological cycles, and soil biological activity in agro-ecosystems. It prioritises management approaches above off-farm inputs because regional conditions necessitate regionally adapted solutions. Instead of synthetic materials, agronomic, biological, and mechanical means are used to fulfil system functions.

According to Balasubramanian (2002), the ecological principles control the agricultural practises used in organic farming. Knowing the genuine spirit and shape of nature is a component of life's philosophy, not an alternative farming method. Soil that is biologically active is the basis of organic farming. Naturally more pest and disease resistant are plants growing in healthy soil.

Prakash (2003) the inadequacy of the cost and return accounting methodologies used to determine the economics of organic farming was analysed by. For a market-based strategy to promote organic farming in India, an economic appraisal of the negative effects of organic agriculture and their internalisation through environmental levies is recommended.

According to Maiti (2007) Organic horticulture is a sector of agriculture, has a long history. Neolithic humans discovered agriculture 8500–9500 years ago. Plant cultivation began with simple technology. Because the land was fertile and undeveloped, early crops did not need fertilisation. Domesticated animal excrement, urine, and other waste materials revitalised agricultural plants. Fertilizing the soil became apparent.

According to Chatterjee (2007) "Organic Farming" does not mean replacing synthetic fertilisers and pesticides with organic, botanical, or microbiological inputs. Real organic farming uses minimal synthetic agrochemicals, fossil fuels, deep level groundwater and other non-renewable resources, non-indigenous plant and animal species, and other such things. Trees, animals, aquatic species, and other things are interwoven with seasonal agricultural production in agro ecological zones. Ultimately, farm-produced biofertilizers, seeds, although though cash returns per unit of land may be lower, only live soil and a healthy ecosystem can produce a stable high yield of nutritious food and offer more employment opportunities with the same amount of invested money.

Singh (2009) examined the history of attempts at organic farming in Malaysia, particularly during the previous 15 years. He covered difficulties in the production, marketing, and

consumer acceptance of organic produce, particularly vegetables. After that, it gives an overview of the current situation, including efforts in kitchen gardening as well as efforts by CETDEM to make organic farming more mainstream. It describes the growing interest in organic produce as well as the challenges faced in getting a better understanding of organic farming and developing Malaysian standards. The interest in organic produce has been growing steadily over the past few years.

According to Yadav (2010) the CWDS has been an active member of IFOAM since the year 1992. The unpredictability of the monsoons, the diversity of the soil, the fragile mountains that are home to a variety of ecosystems, the small and fragmented holdings, and the low socioeconomic base of the farmers all contribute to the difficulty of agriculture in Nepal. Despite all of these challenges, agriculture has continued to be the dominant economic sector in the country, providing employment opportunities and a means of subsistence for the vast majority of the population.

Sharma and Saghvi (2011) explored Indian farmers' organic agriculture challenges. They found that high input costs, inadequate infrastructure, manure shortages, and lack of awareness among consumers, farmers, and policymakers are the main constraints in organic agriculture. The authors suggest that the government provide subsidies and easy credit with low interest rates to farmers and organise workshops, seminars, and conferences on organic farming.

According to Chander et al., (2012) this research, the complementary, supplementary, and sustainable relationship of India's land-cattle Ecosystem is very similar to organic farming practises. There has been some discussion regarding the role that native cattle and buffaloes play in fostering the development of sustainable agricultural practises. This discussion has taken place in the context of the established organic agriculture principles, standards, and procedures. In contrast to Europe, Asian countries such as India have not yet seen the development of organic livestock and organic dairying per se; however, the potential is enormous, and this topic serves as the primary focus of the paper.

According to Debo et al., (2014) China is a sizable agricultural nation that has a long tradition of agricultural production. Traditional Chinese farming did not make use of any man-made chemicals at any point. On the other hand, ever since the 1970s, chemicals like synthetic fertilisers and pesticides have developed into one of the most essential components of agricultural production materials. Over the past three decades, there has been a significant increase in the use of agrochemicals, which has resulted in severe environmental issues. It has

been discovered that a significant contributor to the eutrophication of the major fresh water lakes in China is the addition of nitrogen and phosphorus fertilisers to the land that is used for intensive conventional farming. Chemical pesticides are also closely related to the decline in the world's animal and plant species diversity.

According to Yang et al. (2014) highlighted the practise of establishing an organic farming system and investigating a new path to eradicating poverty, increasing job opportunities, and improving the ecological environment in areas that are afflicted by poverty has been observed to be effective.

FAO (2017) thrives Indian agricultural strategy aims to double farmers' incomes in five to 10 years. Several national and state policy and institutional solutions are being created to increase farm incomes through sustainable and inclusive technical and developmental interventions. Sustainable agricultural intensification (SAI) is defined as increasing output from the same area while preserving land, soil, and environmental services like water and food. This would boost natural capital, environmental services, and community resilience over time. The Sustainable Agriculture Initiative (SAI) optimises agricultural and animal technology, agro ecology, and agronomy using a systems-based approach.

Rajendran (2017) In the case of crops like rice, organic cultivation appears to be less economical as compared to other crops. However there is more scope for minimizing the economic cost and environmental loss, under organic farming system in the long-run (). Besides these, environmental balance is maintained such that crops, trees, animals and man can live more harmoniously. Reducing the use of pesticide can provide the growers with direct economic benefits by decreasing the cost of inputs, thereby increasing net returns.

It was reported by Cacek (2018) that crop diversity in organic farms can have other economic benefits as diversity provides some protection from adverse price changes in a single commodity. Most organic farming practitioners have reported that it was not the premium price of the organic produce but the reduced expenditure on inputs and similar yields to their neighbouring conventional farmers that motivated them towards organic farming.

Cacek et al., (2018). In areas where organic farming is known to be economically feasible, policy barriers to conversion should be identified, evaluated and addressed. Organic farming is an attractive alternative for both farmers and policymakers.

Varkey (2020) contends that countries, developing as well as developed are emphasising environment sustainability of agricultural production, methods and practices. The traditional wisdom of farmers on indigenous agrarian practices increasingly being called into question owing to a host of factors.

Magnaye (2020) examines the relationship between smallholder organic farming and entrepreneurship taking into account the environmental conservation approach of organic farming and the economic enhancement features of entrepreneurship. Furthermore, it intends to determine, through qualitative analysis using case studies, how smallholder organic farming can be planned, and the competencies needed by an organic farmer when venturing into an organic farm enterprise.

2.1. Organic Farming: Agricultural Fraternity Debate

From the purview of above existing studies some controversy regarding organic farming practices are followed.

(i)Can organic agriculture feed the world?

Organic agriculture's function in food security is debated due to crop productivity loss and rising production costs. Several scientific studies have shown that organic farming is the best approach to produce ecologically and economically sustainable crops. Technological breakthroughs are needed to demonstrate large-scale economically viable organic production without time loss.

(ii) Is organic pesticide-free?

Organic food products have no pesticides or other pollutants, according to certifying agency studies.

Organic residue comes from traditional agriculture drift. 21% of USDA-tested organic samples exhibited residues (Savage, 2016). Notwithstanding certain malpractice and violations, organic food products are safer in terms of hazardous residue.

(iii) Does organic taste better?

Organic products include more flavouring, oils, and other taste components, according to Yadav (2010). According to research, large yields in some fruit and vegetable crops with more

chemical fertilisers and other inputs under conventional farming may have compromised crop nutritional and organoleptic quality (Theuer, 2006).

(iv) Does organic food poisoning increase?

Science debates these problems. Organic farming uses more manure. Hence, contamination risk is larger (Yadav, 2010). Most studies find little danger of food poisoning or bacterial infection from organic goods. They're safe like any other system's products.

(v) Is organic food healthier?

Heaton (2001) found that organic food had more nutrients in 43% of cases, equal in 45%, and lower in 11%. Organically cultivated tea and potatoes in India have increased polyphenol and vitamin C levels. Though disputed, trends show their advantage over conventional items.

(vi) Can organic nutrients meet crop needs?

Organic farming relies on input efficiency at every stage. Reduced losses, improved manure enrichment technology, and scientific plant management practises improve plant nutrient uptake and utilisation. If we convert most of India's bio-waste to organic manure, we'll produce 440 million tonnes each year (Ramaswami, 1999). Using technology to convert these resources to organic manure and planning for resource regeneration will enable organic nutrient management become self-sufficient.

(vii) Can organic farmers control pests and diseases?

Conventional cidal pest control with weaker organic pesticides cannot solve organic agriculture's pest/disease problems. Only plant health improvement can solve it. Healthy plants resist pests and diseases.

Hence, organic farmers try to produce plant-healthy environments. Plants become vulnerable to pests and diseases when stressed. Concentrating on plant management to boost physiological activity also reactivates the plant's self-nourishment and self-protection, which reduces pest/disease infestation and allows for effective organic pest control.

(viii) Can organic farming have major environmental benefits?

Conventional agriculture's environmental costs are high, and organic agriculture's environmental benefits are overwhelming. Organic agricultural systems performed

significantly better environmental impact reports and worse in none (Ramesh et al., 2005). The main impact is reducing food chain pesticide and heavy metal residues that harm human health.

(ix) Is organic farming profitable?

Under organic management, replacing external inputs with farm-derived resources should lower variable input costs. Outsourcing large organic inputs, ineffective pest management, and huge production losses usually raise production costs. Organic farming costs more due to man-days. Technology innovations that enable sufficient and timely on-farm resource generation and crop productivity can only lower production costs.

3. Implication of the Study

Despite our country's economic success in recent decades, three critical and interrelated concerns affect the agriculture sector: although cereal production increased over 4.5 folds during last couple of years (Lal, 2004), our country needs to meet the expected food demand of 300 million tonnes of cereals by 2050 from continuously shrinking land resources, rapid degradation of water and land resources reduces use efficiency of fertiliser, irrigation, tillage, e. Increasing industrialization and urbanisation impede farming extension. Fertility mining practises such residue removal, uneven plant nutrient treatment, and uncontrolled and excessive grazing are increasing soil degradation.

Organic farming could meet food demand, maintain soil fertility, and increase soil carbon. According to the latest report (Ramesh, 2010), India exports 585,970 tonnes of organic products worth US$ 6.8 million. Due to price margins, most farmers are choosing organic farming, which may encourage commercial farmers to focus on profit rather than safety, discouraging small farmers. Organic farming in India is also limited by bulk supplement availability. Despite these issues, market demand, institutional support, and farmer interest in organic farming have led to rapid growth in certified organic area over the past years. This district level study examines organic farming in West Bengal and the barriers to its adoption. The studies indicated the need for more and more innovative technologies towards development of infrastructure from field to market that is the pre- requisite for cost effective sustainable organic agriculture in a time bound manner.

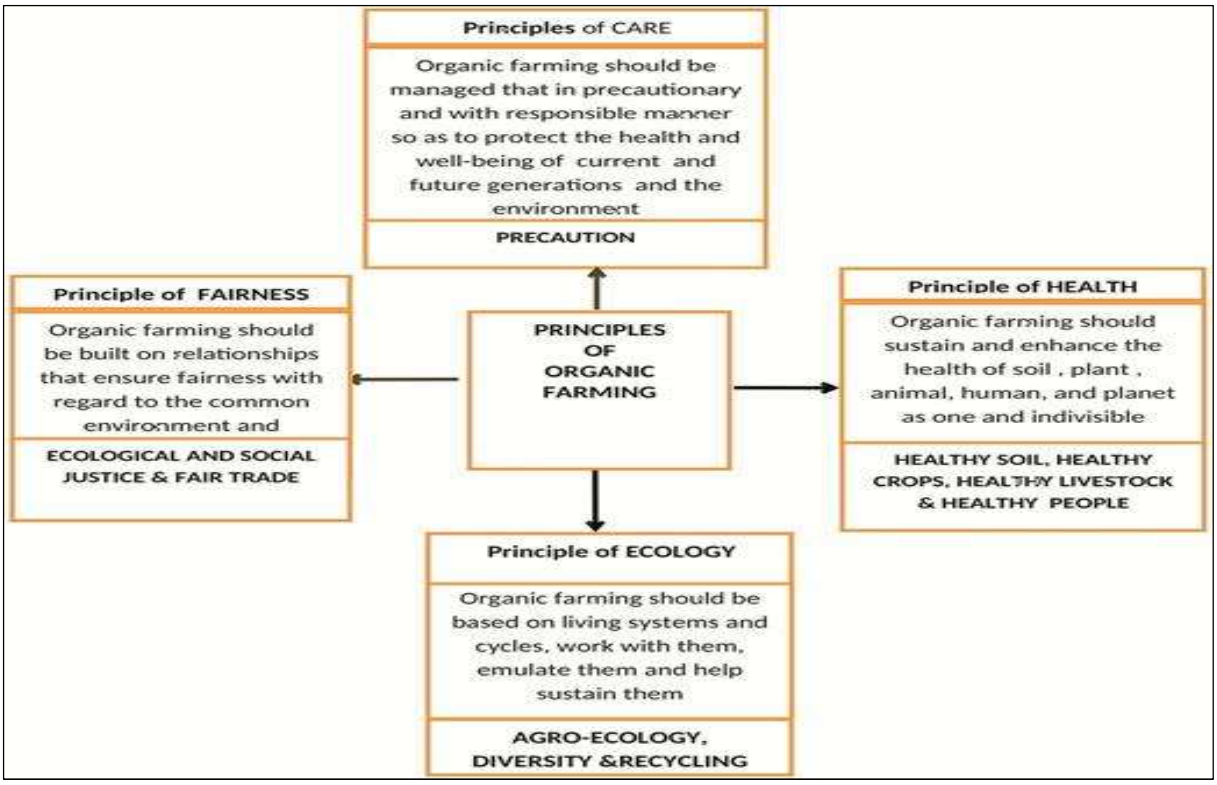

Figure-1: Integrated Framework of Organic Farming

4. Aims and Objectives

It assesses the potential of organic farming in the district and to identify the factors that are likely to influence its success. The study will also identify the constraints that are currently limiting the adoption of organic farming in this district. The study is expected to provide valuable insights into the potential of organic farming in Paschim Medinipur district and the factors that are likely to influence its success. The study will also identify the constraints that are currently limiting the adoption of organic farming in the district and develop recommendations for promoting organic farming in Paschim Medinipur district.

The specific objectives of the study are-

(i) To study the economic differences and similarities between organic and conventional crop cultivation;

(ii) To assess the level of knowledge for adopting organic farming approaches have among farmers of the study area;

(iii) To examine the barriers that prevent people from using organic farming methods in the study area.

5. Materials and Methods

5.1. Study Area

The locale, the West Medinipur district, is located in the southern part of West Bengal state, India. Geographically, the study area is situated between 86°45′E21°45′N and 88°E23′N in the Gangetic West Bengal region with a total geographical area of 9,800 km^2. The major river systems in the study area are the Subarnarekha River to the south and the Kasai River in the heart of the area. Climatologically, the study area falls in the Indo-Gangetic West Bengal region with an annual average rainfall of 1,500 mm, of which more than 80% of the rainfall occurs from June to September (usually characterized as monsoon or wet months). The southwest monsoon is a major source of rainfall in the study area. January and February are the coldest months with an average temperature of 14°C, and April and May are the hottest months with an average temperature of 35°C.

A hard-rock upland, fringe sections covered in laterite, and level alluvial plains make up the distinctive geomorphologic setting of the West Medinipur district. While the eastern part of the district is made up of alluvial plains with recently unconsolidated sediments, the western portion of the district's topography is extremely rugged .The district's northwest and southwest regions are mostly covered in laterites, and the topography is quite erratic. The district's eastern half, which consists of laterite-covered terrain, has a flatter and rolling surface. The district's geology is diverse, with crystalline rocks from the Archean period covering much of the western region. River water and rainfall that seeps into the aquifer serve as the primary sources of groundwater recharge in the research area. The cultivation intensity is around 170% and is supported by a ground-based irrigation. In this region, the most important agricultural products are paddy (Aus, Aman, and Boro), pulses, oil seeds, potato, vegetables, betel vine, and flowers, among other products. The agricultural sector in West Midnapore district is facing some challenges, such as low productivity, lack of irrigation facilities, and inadequate marketing infrastructure. However, the government is taking steps to address these challenges and promote agricultural development in the district.

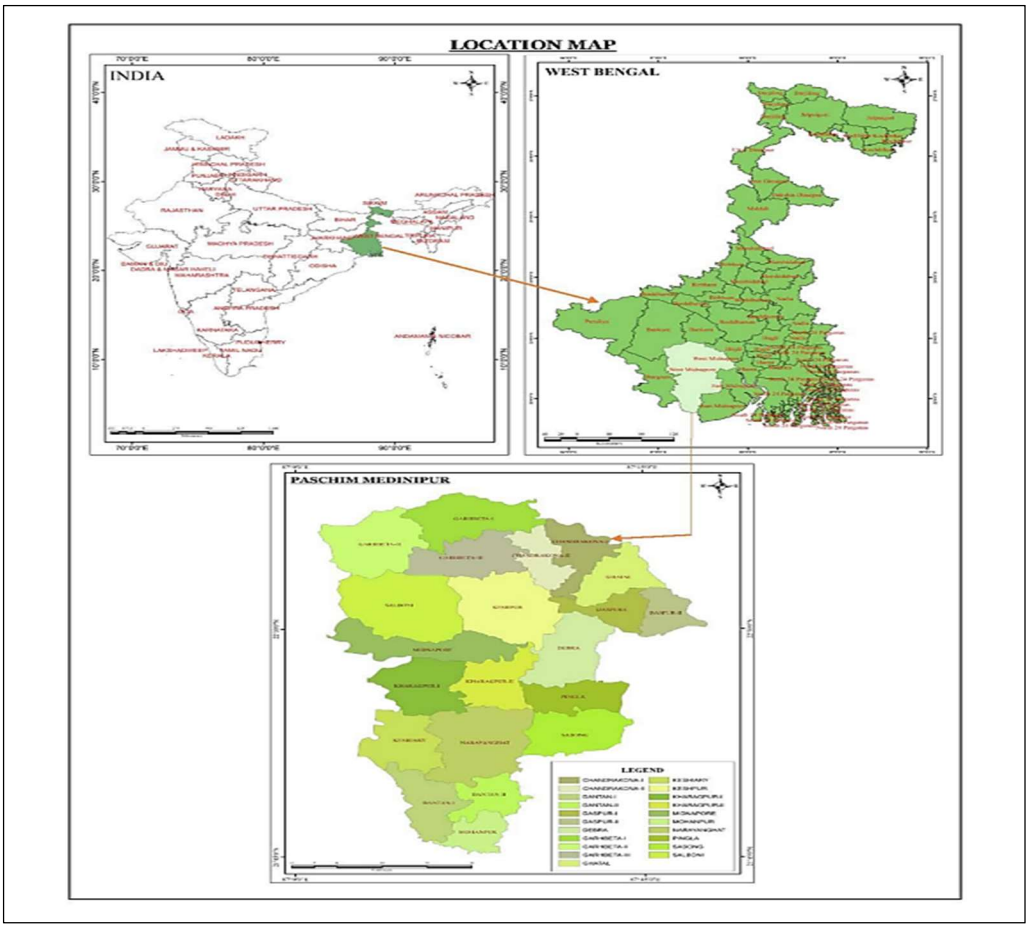

Figure-2: Location Map of the study area (Paschim Medinipur)

(Source: National Informatics Centre and Google Base Map)

The study has been confined to Paschim Medinipur district of West Bengal. At the second stage, village within the district have been purposefully picked for further examination. The village named Dherua, and located in the district that was described. An agency of the government is hard at work within the chosen communities. Nongovernmental organisations (Pradan and Sprecta) are doing work in the other two communities. This apart, the department under Swanirbhar Krishi Prakalpa (SKPs) is collaborating with private agencies on organic farming.

5.2. Data Collection Plan

Both primary and secondary data have been used in this study. Primary Data has collected from the village Dherua within the district of Paschim Medinipur under National Food Security Mission (NFSM) will be randomly picked for further examination. These village is Dherua, and it is located in the district that will be described. The secondary data will be gathered from

various government reports, articles, and other sources such as, District Statistical Handbooks (BOS), Agricultural and Process Food Export Development Authority (APEDA), The Ministry of Agriculture & Farmers Welfare, Census India etc. on categorization of farmers, socio economic and demographic profile of farmers, land occupancy of the farmers, production, yield and export statistics of organic farming products.

5.2. 2. Selection of farmers

On the basis of the size of their land holdings, all of the farmers have been classified into one of two categories: (i) Marginal (between 0.51 ha and 1.00 ha), (ii) Small (1.01 ha to 2.00 ha), and in the area under study, there is not a single large-scale farmer. Using stratified random sampling with proportional allocation, the next step involved selecting 60 farmers from each community of each study village. This included 30 farmers working in organic farming and 30 farmers working in inorganic farming. As a result, each of the total 120 farm households of two selected study villages will be chosen for a more in-depth investigation.

5.2.3. Methods of Data Collection

Personal interviews with respondents using a survey schedule that has been pilot and field-tested specifically for this purpose has used to compile the primary data. Both organic and inorganic farming systems have produced findings pertaining to various elements of farm management and operation. Systematic record of organic farmers (i) indicating the number of years engaged in organic practises; (ii) season wise record of crops both in organic and inorganic farms; (iii) record of cost of cultivation as well as cost of production record for different crops of both group of farmers; (iv) record of price received from sale of products in market; and (v) input uses record both in organic and inorganic farms.

5.2.4. Measurement of Variables

The pertinent factors connected to the adoption and non-adoption of organic farming has been determined on the basis of a thorough evaluation of studies and expert consultation. The factors influencing the adoption of organic farming are scored on a *5-point scale* as follows: very strong = 5, strong = 4, medium = 3, low = 2, and nil = 1. The indicators of non-adoption of organic farming are measured similarly, with very strong = 1, strong = 2, medium = 3, low = 4, and nil = 5.

The factors that have been linked to the *adoption of organic farming* include (i) high profitability, (ii) low production risk, (iii) increased employment potential, (iv) lower ongoing input costs, (v) benefits to human health, (vi) rising consumer demand, (vii) higher organic product prices, and (viii) high quality. Similar to the factors for adoption, those for *non-adoption of organic farming* include (i) lack of awareness; (ii) lack of scope; (iii) small holding size; (iv) lower profitability; (v) lower yield; (vi) high cost of organic inputs; (vii) higher production risk; (viii) lack of market; (ix) lower employment potentiality; (x) non- availability of suitable land, (xi) non-availability of organic inputs, (xii) lack of consumer demand; (xiii) lack of experience on organic farming.

5.3. Data Analysis Tools

The statistical Package for Social Sciences (SPSS26) has been used to calculate the principal component analysis (PCA) to select the determinants to adoption of organic farming in study area as well as analyse to understand the household perception on possibilities and issues of organic farming in selected villages of Paschim Medinipur. We have employed ranking methods to analyse development impacts on organic farming. This methods comprises five steps. First, key performance measures (average yield per hectare, average total production costs per hectare, and average total income per hectare) are identified. Time period selection follows. Our study estimates cluster's influence from 2021 to 2022. The third step collects data on agricultural productivity, cost of cultivation, selling prices, income from agriculture, and demographics like family size, land holdings, etc. The sample farmers only grew paddy, hence only that crop was surveyed. Control group construction follows. Furthermore, impact estimation concludes.

Different cartographic techniques and standard statistical analysis (Chi Square Test) has been used to feed the findings of various analysis. Similarly Qualitative data will be analysed through coding. The result will be assess to the long term sustainability of the organic model is conditioned upon the interplay of agro-climatic conditions and various other socio-economic factors.

6. Results

6.1. Characteristics of the Population's Demographics

The main demographic features of the conventional farmers in the research area are indicated in Table 1, which is located in the previous section. There are four age categories, but the majority of people fall into two of them: those between the ages of 26 and 40 and those between 40 and 55. According to the findings of the survey, the majority of farmers in the area under study are men (95.06%), and male farming practises are the most common. The vast majority of the region's farmers do not have a high level of education, as indicated by the fact that 52.47 percent of farmers did not complete high school. The typical size of a farm operated by a farmer was 13,550.55 square feet.

Table 1: Demographic characteristic of conventional farmer in study area (source based on primary survey)

Variables	Frequency	Percentage
Age (years)		
18–25	17	10.49
26–40	52	32.10
40–55	66	40.74
Above 55	27	16.67
Gender		
Male	154	95.06
Female	8	4.94
Educational qualification		
Less than high school	85	52.47
High school	51	31.48
Collage undergraduate	26	16.05
Monthly income (INR)		
Less than 5000	15	9.26
5000 INR to 10,000	37	22.84
More than 10,000	117	72.22
Marital status		
Married	119	73.46
Unmarried	43	26.54
Farm size (sq. ft.)		
0–8000	22	13.58
8001–16,000	55	33.95
More than 16,000	85	52.47
Children		
None	18	11.11
One	24	14.81
Two	74	45.68
More than two	46	28.40

Chi-square analyses were performed on all 8 parameters, and the results are presented. A score was assigned to each respondent taking into consideration their opinions regarding organic farming. The score for negative attitudes was a "0," while the score for positive attitudes was a "1." Within the context of this procedure, chi-square tests were carried out on independent variables in relation to attitude scores.

Table 2: Model fit values of explanatory variables for adoption of organic farming by chi-square test

Variable	No of Respondents	Chi-square value (X^2)	p-value	Result
1 Age	162	4.5383	0.0443	Reject
2 Knowledge		20.3834	0.0012	Reject
3 Gender		2.1846	0.4465	Accept
4 Farm size		2.6098	0.0599	Accept
5 Environment		14.8276	0.516	Accept
6 Cost		6.0236	0.0364	Reject
7 Benefit		7.5642	0.2015	Accept

Source: Data from Survey

6.2. Organic Farming Adoption Factors

Organic farming knowledge, environmental impact, cost, and benefit were used to assess producer attitudes towards organic farming. Japanese farmers sell directly to consumers. Kenyan farmers discovered that organic farming cuts costs and boosts profits. Uttar Pradesh's farmer who tried organic farming found that sugarcane, rice, wheat, and vegetable yields were lower than chemical farming (Anon 1998). Two-thirds of respondents like organic farming, the poll found. Five of the nine variables analysed significantly influenced respondents' perceptions of organic farming in Madhya Pradesh, India. These include age, education, farm size, rewards, and social features (Patidar and Patidar, 2015). The study suggests that farmers' views in this region will inform future government policies and programmes. Traditional farming is cheaper, thus farmers emphasise it. Organic products have a higher market value and higher production costs than conventionally farmed products, indicating a lack of profit-maximizing tactics. Thus, organic producers must modify their mind-set.

Environmental Aspect

Farmers are knowledgeable of a variety of environmental indicators, such as the ways in which organic farming directly affects soil fertility and the ways in which farmed items are wonderful

for health. As can be seen the median ratings on the Likert scale for each of the statements are extremely high. One interpretation of this change is that conventional farmers are becoming more environmentally concerned. According to the findings of the survey, the primary concern of farmers was the short-term gain of increasing the production of their land. Based on the p-value, it can be concluded that environmental factors do influence farmers' perspectives on organic farming, which means that the null hypothesis cannot be supported for this aspect of the study.

Evaluating knowledge perception of farmers toward organic farming

Statement	Likert scale value (median)
1. Organic farming is easier than non-organic farming	3.62
2. Organic farming needs clean water/soil	3.87
3. Organic farming requires large farm size	4.03
4. Organic farming is not an expensive farming	4.11

Evaluating cost perception of farmers toward organic farming

Statement	Likert scale value (median)
1. Organic farming needs more transport cost	3.02
2. Organic farming needs more labor cost	3.15
3. Organic fertilizers/pesticides are more expensive than non-organic farming	4.15
4. Organic farming enhances more cost for maintenance farm	3.64

Evaluating the benefit perception of farmers toward organic farming

Statement	Likert scale value (median)
1. Organic products are in high demand in native market	2.62
2. Profits are higher than non-organic product	3.47
3. There is enough adequate buyer	2.13
4. Organic product can be sold easily	2.84

Figure 3: Perception of farmers towards organic farming in Dherua, Paschim Medinipur using Likert scale

The Aspect of Knowledge

If conventional farmers desire to transition to organic farming, education is critical because traditional farmers are accustomed to using chemicals in their farming practises. Agricultural institutions and research institutes (such as the Bidhan Chandra Krishi Viswavidyalaya and the Indian Council of Agricultural Research in Barrackpore) claim that the area under examination is not only exceedingly wealthy but also very technologically advanced. According to Ghadim

and Pannell (1999), farmers who have contact with extension professionals and therefore have access to a greater amount of technical information also have a more precise understanding of the processes involved in organic agriculture. According to the survey, a significant number of farmers do not have any interest in organic farming due to the higher cost of organic fertilisers and herbicides. In light of the p-value, it can be concluded that the knowledge aspect null hypothesis should not be accepted. According to the evidence presented, farmers are not as mindful of organic farming. As a consequence, there is less negative behaviour towards environmental implications and more favourable judgements due to better profitability and reduced cultivation costs.

Table 3: Evaluating the environmental perception of farmers toward organic farming

Statement	**Likert scale in value (Median)**
Organic farming improves soil fertility	4.22
Organic products are good for human health	4.31
Organic farming does not pollute water	4.03
Organic farming does not harm soil organism and good insects	3.91

Source: Primary Survey

Cost Aspect

This component is quite distinct from the other four in a number of ways. The remarks that were surveyed are just based on farmers' perceptions of what was meant when they said certain aspects of the cost indicator are important to them. Farmers tend to have conventional attitudes when it comes to the cost element. Because organic farming is more expensive, many farmers have chosen to not practise it. This was one of the primary factors that contributed to the resistance of conventional farmers to organic farming. The cost to the farmer is a factor that determines the farmer's mentality towards organic farming.

Advantageous Facets

According to the findings of market research, the cost of organic products typically exceeds that of their inorganic counterparts. There is evidence that organic foods fetch a higher price

on the market. There is not much of an impact that the benefit components have on the views of conventional farmers; the median value of the farmers' perception of the statements that were polled is typically lower than 3 (the midpoint on the 5-point Likert scale), as is demonstrated. The test result, in contrast to the other component, accepts the null hypothesis. Likewise, the other component does not. In addition to that, the model takes into consideration socioeconomic factors such as age, gender, and the size of the farm. According to the findings of the survey, the age of farmers was a more significant factor in determining their perspective on organic farming than their gender and farm size did not have any significant impact on the attitude of farmers in the study area.

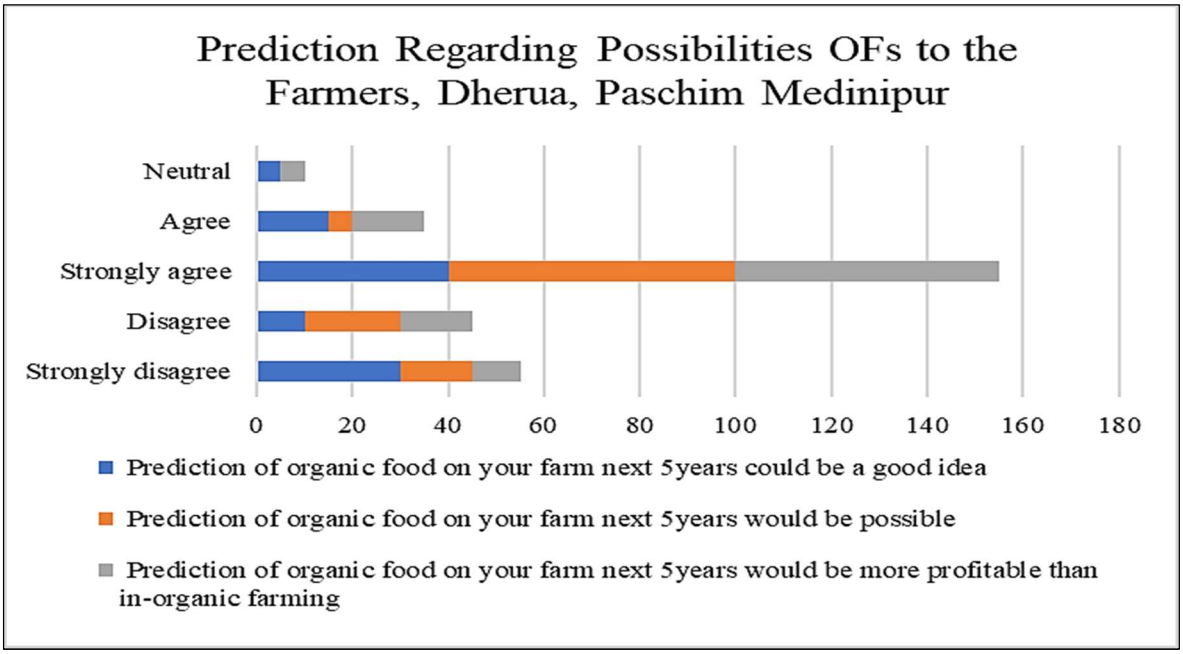

Figure 4: Perceptions of Possibilities of Organic Farming, Dherua, Paschim Medinipur

6.3. Constraints in Adoption of Organic Farming

Organic farming in West Bengal is still in its infancy, but various challenges must be addressed to promote it. To tackle these problems, farmers need systematic limitations analysis. Focus group discussions and structured questionnaires capture inorganic farmers' opinions on organic production's constraints. Rank Based Quotient (RBQ) ranks constraints. RBQ scores rank restrictions. Next, these constraints were categorised by type: socio-economic, infrastructural, environmental, and situational. The survey schedule incorporates these limits using a five-point scoring pattern: "very strong," "strong," "moderate," "low," and "nil" with numerical scores 1, 2, 3, 4, and 5. Ranking socio-economic, infrastructural, environmental, and situational restrictions by score helps quantify their impact on organic agricultural adoption. In this part,

the control group of sample farmers' barriers to organic farming are examined. In these study locations, seventeen obstacles dominate organic agricultural non-adoption.

However, the key obstacles include high input costs, lack of market for organic products, non-availability of organic materials, reduced yield, and no pricing advantage for organic products. Organic product demand and profitability are other issues. Small holding size, inconvenient organic processes, no scope, higher production risk, and lack of adequate land are also deterring farmers from going organic. The primary obstacle to organic farming adoption is socio-economic, followed by infrastructural, technological, and situational. The table shows 53% of restrictions are socio-economic. Infrastructure and technology account for 22% and 13%, respectively. Situational restrictions account for 12%.

Table 4: Field level constraints of organic farming as perceived by the sample farmers of Dherua

Sl.no	Constraints	Score	Rank
1	Not aware	24.67	15
2	No scope	28.33	10
3	Small holding size	30.67	8
4	Lower profitability	36.26	7
5	Lower yield	47.56	4
6	High cost of organic inputs	78.73	1
7	Higher production risk	27.72	11
8	Lacking of price advantage	47.49	5
9	Lack of market	74.71	2
10	Lower employment potentiality	26.03	16
11	More recurring cost for inputs	24.74	14
12	Non-availability of suitable land	27.00	12
13	Non-availability of organic inputs	51.50	3
14	Lack of consumers demand	41.86	6

15	Inconvenience of organic techniques	29.67	9
16	Lack of experience on organic farming	21.67	17
17	Lack of training on organic practices	26.33	13

Source: Field survey

Table 5: Relative importance of different types of constraints of organic farming among the sample farms

Sl.no	Constraints	Percentage coverage of constraints	
		Score	%
1	Socio - economic	339.91	52.71
2	Situational	80.00	12.40
3	Infrastructural	142.90	22.16
4	Technological	82.12	12.73
	Total	644.93	100.00

Source: Primary Survey

The results clearly demonstrate that the main hurdle is the socio-economic in nature and this constraints along with infrastructural, technological and situational constraints should be given due consideration to increase the adoption rate of organic farming.

7. Discussion

7.1. Farmers' Awareness Regarding Organic Farm Practices

In developing nations such as India, exports and primary production are the organic sector's primary sources of revenue. This industry has expanded considerably over the past decade as a result of market-related factors, the availability of resources, and shifting consumer preferences (Zhllima. E et al., 2015). Access to services, information sources, government support policies, and continuous training opportunities are among the essential factors that promote the adoption of sustainable organic farming (Papadopoulos et al., 2018). The study's primary result suggests a positive correlation between a farmer's perceived behavioural control and the likelihood of adopting organic farming techniques (Sharifuddin et al., 2018; Yanakittkul and Aungvaravong, 2020) and discovered that variables such as family, community, group norms, and influential individuals influence a farmer's desire to transition to organic farming. In the research region, however, age, education, and economic factors all play a role in a farmer's decision to adopt organic agricultural techniques. Notably, while farmers are aware of the potential problems associated with conventional agricultural operations, they are not yet prepared to adopt organic farming techniques. In India, the National Mission for Sustainable Agriculture (NMSA) opposes the "biologically-focused green revolution." In addition, the Indian government has launched numerous initiatives to promote organic agriculture, such as the Paramparagat Krishi Vikas Yojana (PKVY), the Rashtriya Krishi Vikas Yojana (RKVY), and the Mission Organic Value Chain Development for the Participatory Guarantee System (PGS) (GOI 2019). The Indian government has launched a number of commendable programmes and initiatives, including the North Eastern Region (MOVCDNER), Participatory Guarantee System (PGS), and National Programme for Organic Production (NPOP), and Network Project on Organic Farming (NPOF), to encourage the adoption of organic farming practises. Implementing these activities could be extremely advantageous for encouraging conventional farmers in the current research region to transition to organic agriculture. The results of the study on farmers' attitudes in this region could provide crucial information for the development of future government policies and programmes on the topic. A recent study found that organic products are primarily sold to foreigners and the upper classes in Bangkok for no evident reason. (Schobesberger et al., 2008) Young people today are very engaged in organic farm marketing, emphasising a positive aspect of organic farming. Farmers are currently advocating for traditional agricultural practises due to their low production costs. Despite the fact that organic products have a higher market selling price but

also higher production costs than conventionally farmed products, the study demonstrates that farmers are oblivious of profit-maximizing strategies. Therefore, it is crucial to alter producers' perceptions of organic agricultural techniques.

7.2. Measures based on the findings of the study Adoption vs. Constraints

These study locations' organic agricultural adoption is hindered by seventeen restrictions. High cost of organic inputs, limited market for organic product, unavailability of organic inputs, low yield, and no price advantage for organic product are the top five obstacles. No organic product demand is the next major restriction. The ranking puts less profitable companies seventh. Small holding size, inconvenience of organic procedures, scope unavailability, increased production risk, and no suitable area for organic farming are the following key obstacles, ranking eighth, ninth, tenth, eleventh, and twelfth, respectively. The thirteenth and fourteenth restrictions include lack of organic practice training and higher input costs. Lack of awareness, limited job prospects, and lack of organic farming experience rank fifteenth, sixteenth, and seventeenth in order of significance. Socio-economic constraints are the biggest obstacle to organic farming adoption, followed by infrastructural, technological, and situational ones.

I. For a modest price premium, the formation of Farmers Organizations may be a crucial component of a solid organic approach.
II. Periodic awareness and training courses for organic farming are necessary.
III. The amount of plant nutrients that should be applied.
IV. Farmers should be shown the financial advantages of using an Integrated Pest Management (IPM) plan in organic farms.
V. Development of Farm Income Insurance Scheme (FIIS), Self Help Group (SHG)-banking linkage scheme, and Kishan Credit Card (KCC) should be prioritized, especially for organic farming.
VI. To boost export in this sector and to support organic farmers, interlinked credit with output for farm production should be started.
VII. A revolving fund allowing farmers to access the initial funding needed for investments in vermicomposting, the production of bio pesticides, livestock, etc. should be part of sound public policy. These are helpful in integrated pesticide, manure, and other systems.

VIII. Governmental incentives or tax exemptions on organic inputs should be applied similarly to conventional inputs, and benefits may be distributed in the form of extension services and assistance with biological pest control.

IX. The government ought to offer a start-up budget as a subsidy for a large-scale farmer conversion plan using types, i.e., organic inputs.

X. An organic product market structure needs to be created.

XI. The public distribution system (PDS) ought to cover organic agriculture products.

XII. The PIA should give proper consideration to first delivering inputs to farmers' doorsteps.

XIII. Farmers and customers should rely on a system of private, self-organized producer organizations and independent certifiers that will offer an economically effective process of certification (for example, PGS, or Participatory Guarantee System).

XIV. Marketing cooperatives can increase the negotiating power of organic growers and so effectively eliminate the margin seized by market intermediaries by pooling the tiny and dispersed produce of the producers.

XV. To increase consumer awareness of organic products and to stimulate a base market demand, organic food products should be integrated into public procurement, such as in schools, hospitals, and other institutions, by requiring at least a certain percentage of organic foods, if these are available.

XVI. To produce or evolve new kinds for organic farming that are suitable for the agro-ecological circumstances of the different regions—in our case, West Bengal—there is an urgent need to intensify research.

XVII. In developing nations, there is an urgent need for public domain research that is adequately funded for sustainable agriculture. The Indian government should establish an Organic Agricultural Research Institute (OARI) with an all-India network of institutions in various states with various agro-ecological conditions.

8. Conclusions

The growing knowledge about the safety and quality of foods, as well as the long term sustainability of the current agricultural system, encourages the adoption of sustainable agriculture practices. Organic farming has evolved as a viable alternative method of agriculture, which not only tackles the issues of quality and sustainability, but also offers profitable livelihood possibilities for rural communities in India. This trend can be attributed to the rise of the organic farming industry. In order to take the first step towards promoting sustainable farming, the government must be creative in its support of unorganized farming groups by using a variety of different approaches. This will enable organic farmers to overcome the challenges they currently face and enable them to achieve social and economic development through the implementation of successful sustainable agricultural practices. A higher price should be determined by the government for organic produce in comparison to conventional produce, and the government should also want to organize workshops, seminars, and conferences for farmers by subject matter experts. The government should provide subsidies to the farmers and provide facilities to avail easy credit with a low interest rate. Farmers were switching to organic farming due to the detrimental effects of chemical and fertilizer use, increased consumer demand for healthy food, and government encouragement of sustainable agriculture. Grassroots organization helped West Bengali farmers practice organic agriculture on a small scale. Some farmers grew aromatic, non-basmati paddy and veggies. Organic paddy had excellent economics despite reduced yield, but farmers deserved more return due to high retail market prices and consumer demand. Organic vegetables had worse profitability than inorganic vegetables due to yield loss and price premium. However, organic veggies are in high demand in organized retail and export markets, so linking farmers with institutional customers would boost their profits.

Farmers disagree that organic farming technique is crucial, despite the area's low organic farming practises and environmental value. The study found that farmers value outcomes over cost. Thus, the study focuses on traditional farmers' attitudes, but it would be more realistic if it included their perceptions and intentions.

9. Future Scope

The future scope of the study on Organic Farming for Sustainable Agriculture in Paschim Medinipur, West Bengal: Determinants of Its Prospects and Constraints is very promising. The study has the potential to provide valuable insights into the factors that influence the adoption of organic farming in the region, as well as the challenges and opportunities that farmers face in transitioning to organic production.

The study could be extended to other districts in West Bengal, as well as to other states in India. It could also be expanded to include a wider range of crops and livestock. The findings of the study could be used to develop policies and programs to promote organic farming in India. Here are some of the specific areas that could be explored in future studies:

- The impact of organic farming on soil health, water quality, and biodiversity.
- The economic benefits of organic farming, including increased crop yields, reduced input costs, and higher prices for organic produce.
- The social benefits of organic farming, such as improved farmer health and well-being, and increased employment opportunities.
- The challenges and barriers to the adoption of organic farming, such as the lack of access to organic inputs, the high cost of certification, and the lack of market demand for organic produce.

The findings of these studies could be used to inform policy decisions and to develop programs that promote organic farming as a sustainable and equitable way to produce food.

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Household Level Questionnaire

Organic Farming for Sustainable Agriculture in Paschim Medinipur, West Bengal: Determinants of its Prospects and Constraints

Research Project

M.A/M.Sc. Semester-IV

Department of Pure and Applied Sciences (Geography)

Midnapore City College

Name of the Surveyor:

Place of Survey:

Block:

District:

Date:

Objective of the Study

This study examined organic farmer's expectance for sustainable agricultural techniques to solve the local food and marketing issues in the Dherua in Paschim Medinipur District, West Bengal. More over this study envisages the economic and environmental sustainability on organic farming in the aforementioned study area. The study will also aim to generate awareness about the benefits of organic farming, promote the adoption of organic farming practices among farmers and encourage the development of a market for organic produce in particular.

1. Name of the head of household:-

2. Total family member(s):-

3. Age:-

4. Sex:-

5. Education:-

6. Asset of household:-

1. How have you heard about organic farming?

i. Radio ☐
ii. News-paper ☐
iii. Television ☐
iv. Family or Friend ☐
v. Mobile phone ☐
vi. Others (Please specify) ☐

2. Have you consume organic food before?

i. Yes ☐
ii. No ☐
iii. Don't know ☐

3. Would you like to consume organic food?

i. Yes ☐
ii. No ☐
iii. Don't know ☐

4. Would you like to visit an organic farm?

i. Yes ☐
ii. No ☐
iii. Don't know ☐

5. Answer about organic farming of consumer.

	Strongly disagree	Disagree	Agree	Strongly agree	Neutral

Organic products are produced without chemical.	☐	☐	☐	☐	☐
Organic food contains more nutrients.	☐	☐	☐	☐	☐
Organic farming good for environment.	☐	☐	☐	☐	☐
Market demand for organic food has positive impact on natural economy.	☐	☐	☐	☐	☐

6. Are you willing to pay more for organically grown product (Vegetable, Fruit, Rice)?

i. Yes ☐

ii. No ☐

7. How much more money is you willingly to spend?

i. Under 25 % ☐

ii. 25 – 50 % ☐

iii. 50 – 75 % ☐

iv. More than 75 % ☐

8. A. Annual income of the household

:-

B. Approximately weakly expenditure for food consumption

:-

C. Which common vegetables and fruits that you prefer to use for consumption

:-

D. From where you obtain or gather food for consumption?

i. Farm ☐

ii. Local Market ☐

iii. Weakly Market ☐

iv. Whole sheller ☐

v. Others ☐

7. How much more money is you willingly to spend?

i. Under 25 % ☐

ii. 25 – 50 % ☐

iii. 50 – 75 % ☐

iv. More than 75 % ☐

9. Do you purchase organic seeds?

i. Yes ☐
ii. No ☐

10. Do you have green house facilities in your farm?

i. Yes ☐
ii. No ☐

11. A. Source of water for irrigation

i. Well ☐
ii. Pond ☐
iii. River ☐
iv. Canal ☐
v. Ground water ☐

B. What equipment/method do you use in your farm in water? -

12. What do you prevent insect problem in your farm? -

13. What organic and in-organic crops are grown?

Organic	In-organic

14. Soil type of your area: -

15. Have you check soil fertility in your area?

i. Yes ☐
ii. No ☐

16. A. What is the major component of soil and crop management plant?

i. Crop rotation ☐
ii. Summer fellow ☐
iii. Inter planting ☐
iv. Cover crop ☐
v. Use of green manure ☐
vi. Others (please specify) ☐

B. Do you burn crop residues?

i. Yes ☐
ii. No ☐

C. Do you apply sludge to the field?

i. Yes ☐
ii. No ☐

17.. What forms of manicure do you use?

i. Liquid ☐
ii. Semi liquid ☐
iii. Piled ☐
iv. Fully Composed ☐

18. A. What step do you take plan for bio-diversity conservation?

i. Understand farm location within watershed ☐
ii. Natural Resource Management ☐
iii. Conservation Priorities ☐
iv. Restore native plant and animal ☐

B. Have you faced soil erosion in your area?

i. Yes ☐
ii. No ☐

19. A. Have your different space in-organic or organic crop storage?

i. Yes ☐
ii. No ☐

B. Have you used any artificial preserving storage & marketing crops?

i. Yes ☐
ii. No ☐

C. Who is responsible for arranging the product for market?

i. Self ☐
ii. Buyer ☐
iii. NGO'S ☐
iv. Others ☐

D. Have you any information regarding organic certification? :-

E. Have you borrowed the extra cost of certification? :-

20. Prediction regarding Organic Foods

Queries	Strongly disagree	Disagree	Strongly agree	Agree	Neutral
Do you think prediction of organic food on your farm next 5years could be a good idea?	☐	☐	☐	☐	☐
Do you think prediction of organic food on your farm next 5years would be possible?	☐	☐	☐	☐	☐
Do you think prediction of organic food on your farm next 5years would be more profitable than in-organic farming?	☐	☐	☐	☐	☐

21. What are the major problems do you faced from in-organic to organic farming? –

Different Field Experiences from Study Village of Paschim Medinipur